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Continued on last page

(54) [Title] MULTICAST INFORMATION DISTRIBUTION CONTROL METHOD AND SYSTEM, AS WELL AS SERVER AND CLIENT

(57) Abstract

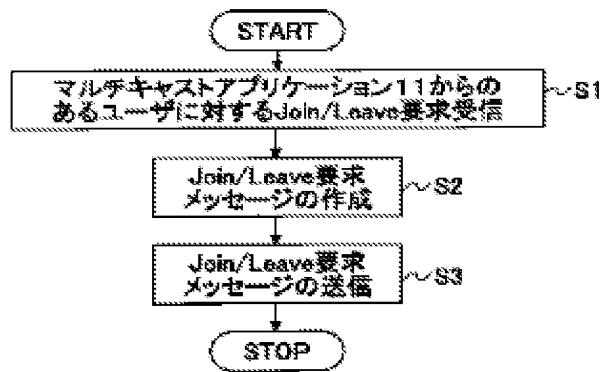
Problem

The objective of the present invention is to provide a multicast information distribution control method and system that can provide the opportunity of Join processing or Leave processing for a client from a communication device other than said client.

Means to solve

The aforementioned objective is realized by the following multicast information distribution control method and system. Request information is sent to said client from a communication device other than said client according to a communication procedure, which is different from the communication procedure related to the multicast distribution of said information and can be implemented by said prescribed communication network. Said prescribed processing is carried out based on said received request information in said client. Said client receives the information multicast distributed from said server or ends said reception.

Flow chart illustrating an example of the procedure for sending Join/Leave request message



Key: S1 Receive a Join/Leave request with respect to a certain user from multicast application 11
 S2 Form a Join/Leave request message
 S3 Send the Join/Leave request message

[There are no amendments to this patent.]

Claims

1. A multicast information distribution control method for a client that performs a prescribed processing to receive information multicast distributed via a prescribed communication network from a server or to end said reception, wherein

request information is sent to said client from a communication device other than said client according to a communication procedure, which is different from the communication procedure related to the multicast distribution of said information and can be implemented by said prescribed communication network;

said prescribed processing is carried out based on said received request information in said client; and

said client receives the information multicast distributed from said server or ends said reception.

2. The multicast information distribution control method described in Claim 1, wherein

said request information is sent to said client from a server acting as the information distributor.

3. The multicast information distribution control method described in Claim 1 or 2, wherein

said prescribed communication network is a network related to a mobile communication system, and

said request information is sent to a mobile device acting as said client according to the communication procedure of short message service (SMS) provided by said mobile communication system from said communication device.

4. The multicast information distribution control method described in any of Claims 1-3, wherein

when a prescribed operation is performed by the client that has received said request information, said prescribed processing is started based on the request information.

5. A multicast information distribution control system for a client that performs a prescribed processing to receive information multicast distributed via a prescribed communication network from a server or to end said reception, wherein

the system has a communication device that sends request information to said client according to a communication procedure, which is different from the communication procedure related to the multicast distribution of said information and can be implemented by said prescribed communication network;

said client has a processing control means that performs said prescribed processing based on said request information received by the client, and the client receives the information multicast distributed from said server or ends said reception.

6. The multicast information distribution control system described in Claim 5, wherein said communication device that sends said request information to said client becomes a server acting as an information distributor.

7. The multicast information distribution control system described in Claim 5 or 6, wherein

said prescribed communication network is a network related to a mobile communication system, and

said communication device sends said request information to a mobile device acting as said client according to the short message service (SMS) communication procedure provided by said mobile communication system.

8. The multicast information distribution control system described in any of Claims 5-7, wherein

when a prescribed operation is performed by the client that has received said request information, said processing control means starts said prescribed processing based on the request information.

9. A server in a multicast information distribution control system for a client that performs a prescribed processing to receive information multicast distributed via a prescribed communication network from a server or to end said reception, wherein

the server has a request information generating means that generates request information including the information needed so that said prescribed processing can be performed by the client and a request information transmission control means that sends the request information generated by said request information generation means to said client according to a communication procedure, which is different from the communication procedure related to the multicast distribution of said information and can be implemented by said prescribed communication network;

upon receiving said request information, the client performs said prescribed processing based on the request information to receive the multicast distributed information or ends said reception.

10. The server described in Claim 9, wherein

said prescribed communication network is a network related to a mobile communication system, and

said request information transmission control means sends said request information to a mobile device acting as said client according to the short message service (SMS) communication procedure provided by said mobile communication system.

11. A client that can perform a prescribed processing to receive information multicast distributed via a prescribed communication network from a server or ends said reception, wherein

the client has a request information acquisition means that acquires request information sent from a communication device other than the client according to a communication procedure, which is different from the communication procedure related to the multicast distribution of said information and can be implemented by said prescribed communication network, and

a processing control means that performs said prescribed processing based on said request information acquired by said request information acquisition means; and the client receives the information multicast distributed from said server or ends said reception depending on said prescribed processing.

12. The client described in Claim 11, wherein

said prescribed communication network is a network related to a mobile communication system, and

said request information acquisition means acquires said request information sent from said communication device according to the short message service (SMS) communication procedure provided by said mobile communication system.

13. The client described in Claim 11 or 12, wherein

said processing control means starts said prescribed processing based on the request information when a prescribed operation is performed by the client after said request information is acquired by said request information acquisition means.

Detailed explanation of the invention

[0001]

Technical field of the invention

The present invention pertains to a multicast information distribution control method and system. More specifically, the present invention pertains to a multicast information distribution control method and system for enabling reception of multicast distributed information by a client or ending reception of the information by the client.

[0002]

The present invention also pertains to a server acting as an information distributor, which performs processing according to said multicast information distribution control method, and to a client acting as the information receiver.

[0003]

Prior art

In a conventional multicast information distribution system, the processing for enabling reception of multicast distributed information by a client and the processing for ending reception of said information are carried out as follows.

[0004]

A client that wants to receive distributed information enters a state that can receive the information (packets) sent to the multicast IP address corresponding to the multicast group (the operation of receiving the data sent to the multicast IP address is started, and the port with the port number corresponding to the multicast IP address is open). Then, the client notifies the multicast IP address according to IGMP (Internet Group Management Protocol) with respect to the routers in the IP network to which it is connected and declares the fact of receiving the information (packets) sent to that multicast IP address (Join). When the client declares its receiving of the information sent to said multicast IP address (Join), the information sent to said multicast IP address from each router in the IP network can reach the client.

[0005]

On the other hand, to end receiving the information sent to the multicast IP address by the client, the client releases the state that can receive the information sent to the multicast IP address (the operation of receiving the data sent to the multicast IP address is ended, and the port with the port number corresponding to the multicast IP address is closed). Then, the client declares the fact of ending reception of the information sent to the multicast IP address according to IGMP with respect to the router in the IP network to which it is connected (Leave). When the client declares its ending of reception of the information sent to the multicast IP address (Leave), the information sent to the multicast IP address from each router in the IP network will not arrive at the client.

[0006]

Problems to be solved by the invention

In the aforementioned multicast information distribution system, the opportunity for the processing of enabling reception of multicast distributed information by the client or for the processing for ending the reception of the information by the client is provided within the client on the side that constantly receives multicast distribution of the information. However, depending on the type of information to multicast distribute (emergent information, propaganda information, useful information in a certain group), it may be inappropriate to provide the opportunity for the processing of receiving the information or ending reception of the information by the client within the client.

[0007]

For example, disaster information should be distributed emergently to the client no matter whether the client is in the information receivable state or not. In this case, it is preferred to provide the opportunity for the processing of enabling reception of the disaster information by the client from the information distributor.

[0008]

Also, for advertising information regarding a service with period (time) limitation (so-called time service), the fact that the information can be received by the client within said period and reception of the information by the client will be ended when said period expires is very important to the advertiser and the client-end user. In this case, it is preferred to provide the opportunity for the processing of enabling reception of the information by the client and the processing of ending the reception from the information distributor.

[0009]

In addition, when one user in a group having a plurality of users has found some useful information, making said information receivable by the communication terminals (clients) of other users would be convenient to each user in that group. In this case, it is preferred to provide the opportunity for the processing of enabling reception of said information by the communication terminal (client) of a certain user from the communication terminals of other users.

[0010]

Therefore, the first objective of the present invention is to provide a multicast information distribution control method and system that can provide the opportunity of Join processing or Leave processing for a client from a communication device other than said client.

[0011]

The second objective of the present invention is to provide a server acting as the information distributor that carries out processing according to the multicast information distribution control method.

[0012]

The third objective is to provide a client acting as the information receiver that carries out processing according to the multicast information distribution control method.

[0013]

Means for solving the problem

In order to realize the first objective, as described in Claim 1, the present invention provides a multicast information distribution control method for a client that performs a prescribed processing to receive information multicast distributed via a prescribed communication network from a server or to end said reception. According to this method, request information is sent to said client from a communication device other than said client according to a communication procedure, which is different from the communication procedure related to the multicast distribution of said information and can be implemented by said prescribed communication network. Said prescribed processing is carried out based on said received request information in said client, and said client receives the information multicast distributed from said server or ends said reception.

[0014]

In this multicast information distribution control method, the client can carry out the aforementioned prescribed processing based on the request information sent from a communication device other than the client to receive the information multicast distributed from the server or end the reception.

[0015]

There is no special limitation on the aforementioned prescribed communication network as long as it can multicast distribute information and transfer information according to a

communication procedure other than the communication procedure related to the multicast distribution.

[0016]

The aforementioned prescribed processing is for enabling reception of multicast distributed information or for ending said reception. For example, in the case of multicast distribution of information according to the IP communication procedure, it includes the processing for notifying the multicast IP address to an IP router and declaring to distribute the information sent to the multicast IP address (Join) and the processing for declaring to end reception of the information sent to the multicast IP address (Leave).

[0017]

From the point of view of providing an opportunity for the aforementioned prescribed processing in the client from the server acting as the distributor of the multicast distributed, according to the present invention, as described in Claim 2, said request information is sent to said client from a server acting as the information distributor.

[0018]

From the point of view of application to the case when information is multicast distributed to a mobile device acting as the client, according to the present invention, said prescribed communication network is a network related to a mobile communication system, and said request information is sent to a mobile device acting as said client according to the short message service (SMS) communication procedure provided by said mobile communication system from said communication device.

[0019]

From the point of view that reception of multicast distributed information or ending said reception can be determined by the client-end user, according to the present invention, as described in Claim 4, in each of the aforementioned multicast distribution control methods, when a prescribed operation is performed by the client that has received said request information, said prescribed processing is started based on the request information.

[0020]

In such a multicast distribution control method, when the client-end user performs the aforementioned prescribed operation, the aforementioned prescribed processing is started based on the request information. In other words, reception of the multicast distributed information by

the client or ending of said reception can be determined by the aforementioned prescribed operation.

[0021]

In order to realize the aforementioned first objective, as described in Claim 5, the present invention provides a multicast information distribution control system for a client that performs a prescribed processing to receive information multicast distributed via a prescribed communication network from a server or to end said reception. The system has a communication device that sends request information to said client according to a communication procedure, which is different from the communication procedure related to the multicast distribution of said information and can be implemented by said prescribed communication network. Said client has a processing control means that performs said prescribed processing based on said request information received by the client, and the client receives the information multicast distributed from said server or ends said reception.

[0022]

In order to realize the aforementioned second objective, as described in Claim 9, the present invention provides a server in a multicast information distribution control system for a client that performs a prescribed processing to receive information multicast distributed via a prescribed communication network from a server or to end said reception. The server has a request information generating means that generates request information including the information needed so that said prescribed processing can be performed by the client and a request information transmission control means that sends the request information generated by said request information generation means to said client according to a communication procedure, which is different from the communication procedure related to the multicast distribution of said information and can be implemented by said prescribed communication network. Upon receiving said request information, the client performs said prescribed processing based on the request information to receive the multicast distributed information or ends said reception.

[0023]

In order to realize the aforementioned third objective, as described in Claim 11, the present invention provides a client that can perform a prescribed processing to receive information multicast distributed via a prescribed communication network from a server or ends said reception. The client has a request information acquisition means that acquires request information sent from a communication device other than the client according to a

communication procedure, which is different from the communication procedure related to the multicast distribution of said information and can be implemented by said prescribed communication network, and a processing control means that performs said prescribed processing based on said request information acquired by said request information acquisition means. The client receives the information multicast distributed from said server or ends said reception depending on said prescribed processing.

[0024]

Embodiment of the invention

In the following, the embodiment of the present invention will be explained with reference to figures.

[0025]

For example, a system, to which the multicast information distribution control method and system disclosed in an embodiment of the present invention is applied, has the configuration shown in Figure 1. In this example, in a mobile communication system, multicast distribution of the information is performed from a server acting as the information distributor to a mobile device acting as a client (cellular phone, portable information terminal (PDA), PC terminal connected to a cellular phone, or the like).

[0026]

As shown in Figure 1, mobile communication system 100 has transmission network 50 and a plurality of radio base stations 20₁, 20₂, 20₃, ..., 20_n. Then, server 10 acting as the information distributor is connected to transmission network 50. Transmission network 50 has a plurality of IP routers connected to each other by communication paths. IP routers having a radio communication control function are included in the plurality of IP routers. One of said radio base stations 20₁-20_n is connected to each IP router having the radio communication control function. The information (packets) sent out from server 10 to mobile device 30 is transmitted sequentially by each IP router in transmission network 50 by following a prescribed routing procedure (multicast routing procedure, unicast routing procedure, or the like). Then, the information that has reached an IP router having the radio communication control function is sent from the radio base station 20_i (i is 1, ..., n) connected to that IP router to mobile device 30.

[0027]

Said server 10 has multicast application 11, multicast management part 12, communication control device 12, and storage device 14. Multicast application 11 carries out

processing to multicast distribute the information stored in storage device 14 to mobile device 30 acting as the client. Multicast management part 12 can form a Join/Leave request message for providing an opportunity for the control of enabling reception of the multicast distributed information by mobile device 30 (Join) or for the control of ending said reception (Leave) corresponding to the request from multicast application 11 and can control transmission of said message to mobile device 30. The transmission is controlled according to a communication procedure that can be provided by mobile communication system 100 other than the IP communication procedure used when performing multicast distribution of the information (packets). For example, the transmission can be controlled according to SMS (short message service) or a communication protocol for control that can be provided by mobile communication system 100 and includes the control information needed when mobile device 30 opens a bearer (communication path) in mobile communication system 100. If the bearer (communication path) has been opened, it is also possible to control transmission of the Join/Leave request message with respect to mobile device 30 according to the unicast routing procedure.

[0028]

Communication control device 13 performs communication control in the mobile communication system 100 of server 10. More specifically, transmission of the information (packets) to the multicast IP address to transmission network 50 is controlled under the instruction from multicast application 11. Also, communication control device 13 sends the Join/Leave request message to mobile device 30 according to the aforementioned transmission control performed by multicast management part 12. Also, said communication control device 13 communicates with the contents server or advertising information server on the Internet via gateware 150 to acquire the information to distribute. Then, the information to distribute is stored in storage device 14 by multicast application 11.

[0029]

In mobile communication system 100 with the aforementioned configuration, mobile device 30 acting as the client needs to carry out processing (referred to as Join processing hereinafter) for enabling reception of the multicast distributed information the same as in the conventional system in order to receive the multicast distributed information from server 10. Also, said mobile device 30 needs to carry out processing (referred to as Leave processing hereinafter) for ending reception of said information the same as in the conventional system in order to end reception of the information.

[0030]

Server 10 that performs multicast distribution of information sends a Join/Leave request message to be described later to mobile device 30 acting as the client in order to provide the opportunity for said Join processing in said mobile device 30 when distributing the information to mobile device 30 acting as the client or provide the opportunity for said Leave processing in said mobile device 30 when there is no need to distribute the information to said mobile device 30. The processing for sending the Join/Leave request message to the client is carried out as follows.

[0031]

First, in the case of receiving distributed information (for example, disaster information, advertising information, or the like) by mobile device 30 acting as a client having a distribution contract or in the case of stopping said reception, multicast application 11 sends a Join/Leave request with respect to said mobile device 30 including the following information to multicast management part 12.

[0032]

1) Client address

This is an address (MSISDN (telephone number), SMS address) used for identifying the client in the communication procedure (out-of-band communication procedure) adopted for controlling transmission of the Join/Leave request message by multicast management part 12.

[0033]

2) Multicast IP address

This is a multicast IP address needed by mobile device 30 acting as the client to declare reception of new information (Join) or declare ending said reception (Leave).

[0034]

3) Port number

This is a port number needed by mobile device 30 acting as the client to start a new reception or to end the reception.

[0035]

4) Join/Leave identifier

This is an identifier used to identify whether the Join/Leave request message is a Join request or a Leave request.

[0036]

5) Server address

This is the IP address of server 10 acting as the distributor of the information to multicast distribute.

[0037]

6) User confirmation identifier

This is an identifier used to identify whether the Join/Leave request message is received forcibly by mobile device 30 acting as the client or the request message is received depending on a selecting operation by the user. If this identifier is ON, mobile device 30 acting as the client will automatically receive the Join/Leave request message and carry out the processing according to the received message. If this identifier is OFF, mobile device 30 acting as the client will notify (display or the like) the user that a Join/Leave request message has been received, and the user can determine whether to accept that request message. If the user chooses to accept the request message, mobile device 30 will carry out the processing according to that request message.

[0038]

7) User inquiry message

This is a message notifying the user of the distribution of the information (disaster information, advertising information, or the like). This message may also include any character string (message) depending on the input operation by server 10.

[0039]

Then, multicast management part 12 carries out a processing, for example, according to the procedure shown in Figure 2.

[0040]

As shown in Figure 2, when multicast management part 12 receives a Join/Leave request including said information 1)-7) from multicast application 11 (S1), it forms a Join/Leave request message based on said information 1)-7) (S2). Said Join/Leave request message has such a message format that it can be sent according to a communication procedure adopted by multicast management part 12 but different from the communication procedure (IP communication procedure) of multicast distribution, for example, the communication procedure of SMS (short message service).

[0041]

The format of the message sent according to said SMS communication procedure is comprised of a control information part for Join/Leave request message and a message part as shown in Figure 3 in addition to the header for control that is originally used by SMS. The control information part includes said information:

- 1) Client address (for example, telephone number: 090-1234-5678)
- 2) Multicast IP address (for example, 226.0.0.1)
- 3) Port number (for example, 40124)
- 4) Join/Leave identifier (for example, Join)
- 5) Server address (for example, 192.0.0.1)
- 6) User confirmation identifier (for example, OFF). The message part also includes said
- 7) User confirmation inquiry message (for example, "emergent earthquake information").

[0042]

When a Join/Leave request message having the aforementioned format is formed, multicast management part 12 controls transmission of the Join/Leave request message with respect to mobile device 30 identified by the client address (for example, telephone number: 090-1234-5678) according to the SMS communication procedure (S3). Then, the Join/Leave request message is sent to mobile device 30 by communication control device 13 under said transmission control. The Join/Leave request message transmitted from communication control device 13 is transmitted according to the SMS communication procedure in said mobile communication system 100 to said mobile device 30 from a radio base station used by mobile device 30 to carry out radio communication, such as radio base station 20₁.

[0043]

On the other hand, mobile device 30 acting as the client carries out the processing by following the procedure shown in Figure 4.

[0044]

As shown in Figure 4, when mobile device 30 receives the message transmitted in mobile communication system 100 according to the SMS communication procedure as described above (S11), it is determined whether the received message is a normal message sent to the user or the aforementioned Join/Leave request message with reference to the header for control used by SMS (S12). If the received message is a normal message sent to the user, mobile device 30 carries out the normal SMS reception processing (mail reception processing).

[0045]

On the other hand, if the received message is the aforementioned Join/Leave request message, mobile device 30 determines whether to receive this Join/Leave request message based on the user confirmation identifier of the control information part of said Join/Leave request message (S14). If the identifier is in the ON state, mobile device 30 determines to receive said Join/Leave request message. If the identifier is in the OFF state, mobile device 30 will display the fact that the Join/Leave request message has been received and display the user confirmation inquiry message included in the message part (for example, "emergent earthquake message"). Then, mobile device 30 determines whether the user chooses to accept or not accept the Join/Leave request message. If the user operates to accept the message, mobile device 30 determines to accept said Join/Leave request message.

[0046]

Mobile device 30 can also preset a mode for forcibly receiving the Join/Leave request message. In this case, when said identifier is in the OFF state, it is determined whether to accept the Join/Leave request message based on whether said mode is set.

[0047]

If it is found that the Join/Leave request message has been accepted as described above, mobile device 30 further determines whether a bearer (communication path) has been opened with respect to mobile device 30 in transmission network 50 (S15). If no bearer has been established, mobile device 30 carries out a processing to establish the bearer (S16) and then carries out Join processing or Leave processing according to the received Join/Leave request message. If the bearer has been established, the mobile will directly carry out the Joint processing or Leave processing (S17).

[0048]

For example, if the Join/Leave identifier of the control information part in the Join/Leave request message is "Join," mobile device 30 carries out the Join processing. That is, in order to enter the state of receiving the information sent to the multicast IP address (for example, 226.0.0.1) included in the Join/Leave request message, the multicast IP address is set, and the port with the port number included in the Join/Leave request message is opened. Then, mobile device 30 notifies the multicast IP address according to IGMP with respect to the IP router in transmission network 50 connected to radio base station 20; that performs radio communication with said mobile device 30 and declares to receive the information sent to said multicast IP address (Join).

[0049]

On the other hand, if the Join/Leave identifier of the control information part in the Join/Leave request message is "Leave," mobile device 30 carries out the Leave processing. In order to release the state of receiving the information sent to the multicast IP address included in the Join/Leave request message, the setting of the multicast IP address used as the address of the information that has been distributed so far is released, and the port with the port number included in the Join/Leave request message is closed. Then, mobile device 30 declares ending the reception of the information sent to the multicast IP address according to IGMP with respect to the IP router in transmission network 50 connected to radio base signal 20₁ that performs radio communication with mobile device 30.

[0050]

In the aforementioned processing, if the user chooses not to accept the request message when mobile device 30 has received the Join/Leave request message (if the user does not want to receive the distributed information or end the reception), it is judged that the request message will not be accepted (see S14), and the aforementioned processing is ended directly.

[0051]

According to the multicast information distribution control method for the aforementioned mobile communication system 100, the opportunity for Join processing or Leave processing to be carried out by mobile device 30 is provided by the Join/Leave request message sent from server 10 acting as the multicast distributor of the information according to the SMS communication procedure. Consequently, the multicast distributed disaster information or advertising information can be received by mobile device 30 acting as the client, or said reception can be ended as controlled by server 10 acting as the distributor.

[0052]

In the aforementioned application example, the Join processing or Leave processing to be carried out by mobile device 30 acting as the client is started based on the Join/Leave request message sent from server 10 acting as the information distributor. The sender of the Join/Leave request message, however, is not limited to server 10. For example, the Join/Leave request message can also be transmitted, for example, according to SMS communication procedure from another communication terminal (mobile device, PC terminal, or the like) that can receive multicast distribution of the same information to mobile device 30. In this case, the opportunity for the Join processing or Leave processing to be carried out by mobile device 30 can be provided from other communication terminals.

[0053]

In the aforementioned example, multicast distribution of information from server 10 in the mobile communication system to mobile device 30 acting as the client has been explained. Even if the client is a fixed machine (PC terminal or the like), the processing (application of the multicast information distribution control method disclosed in the present invention) can still be carried out in the aforementioned procedure.

[0054]

In each of the aforementioned examples, the processing of S12, S14, S15, S16, S17 shown in Figure 4 corresponds to the start control means (operation response start control means). The processing of S1, S2 shown in Figure 2 corresponds to the request information generation means. The processing of S3 corresponds to the request information transmission control means. The processing of step S11 shown in Figure 4 corresponds to the request information acquisition means.

[0055]

Effects of the invention

As explained above, according to the invention described in Claims 1-8, a client carries out the aforementioned prescribed processing based on the request information sent from a communication device other than the client so that it can receive the information multicast distributed from a server or end the reception. Consequently, it is possible to realize a multicast information distribution control method and system, which can provide the opportunity for the processing of enabling reception of the multicast distributed information by the client or the processing of ending said reception from a communication device other than the client.

[0056]

According to the invention described in Claim 9 or 10, it is possible to realize a server acting as the information distributor that carries out the processing according to the aforementioned multicast information distribution control method.

[0057]

According to the invention described in Claims 11-13, it is possible to realize a client acting as the information receiver that carries out processing according to the aforementioned multicast information distribution control method.

Brief description of figures

Figure 1 is a diagram illustrating a configuration example of a mobile communication system to which the multicast information distribution control method disclosed in an embodiment of the present invention is applied.

Figure 2 is a flow chart illustrating an example of the procedure of sending a Join/Leave request message.

Figure 3 is a diagram illustrating an example of the format of the Join/Leave request message.

Figure 4 is a flow chart illustrating an example of the processing carried out by the client after it has received a Join/Leave request message.

Explanation of symbols

10	Server
20 ₁ , 20 ₂ ,..., 20 _n	Radio base station
30	Mobile device (client)
50	Transmission network
100	Mobile communication system
150	Gateware

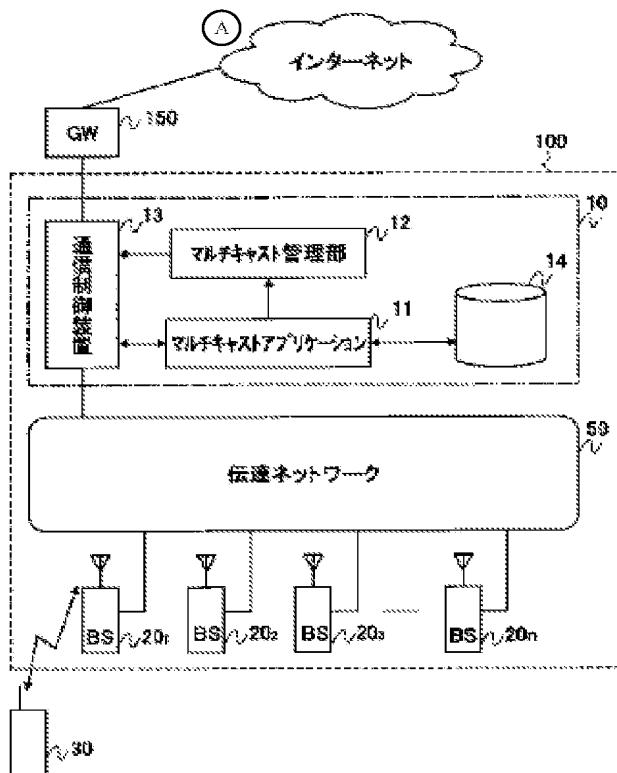


Figure 1. Diagram illustrating a configuration example of a mobile communication system to which the multicast information distribution control method disclosed in an embodiment of the present invention is applied

Key:

- A Internet
- 11 Multicast application
- 12 Multicast management part
- 13 Communication control device
- 50 Transmission network

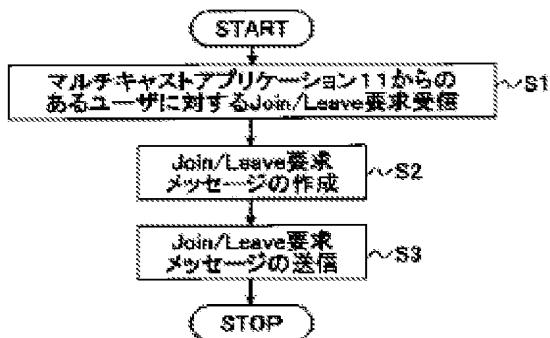


Figure 2. Flow chart illustrating an example of the procedure of sending a Join/Leave request message

Key:

- S1 Receive a Join/Leave request with respect to a certain user from multicast application 11
- S2 Form a Join/Leave request message
- S3 Send the Join/Leave request message

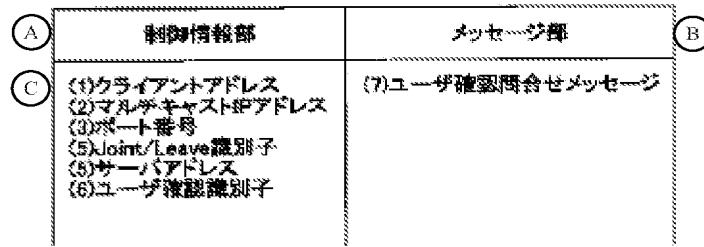


Figure 3. Diagram illustrating an example of the format of the Join/Leave request message

Key:

- A Control information part
- B Message part
- C
 - (1) Client address
 - (2) Multicast IP address
 - (3) Port number
 - (4) Join/Leave identifier
 - (5) Server address
 - (6) User confirmation identifier
 - (7) User confirmation inquiry message

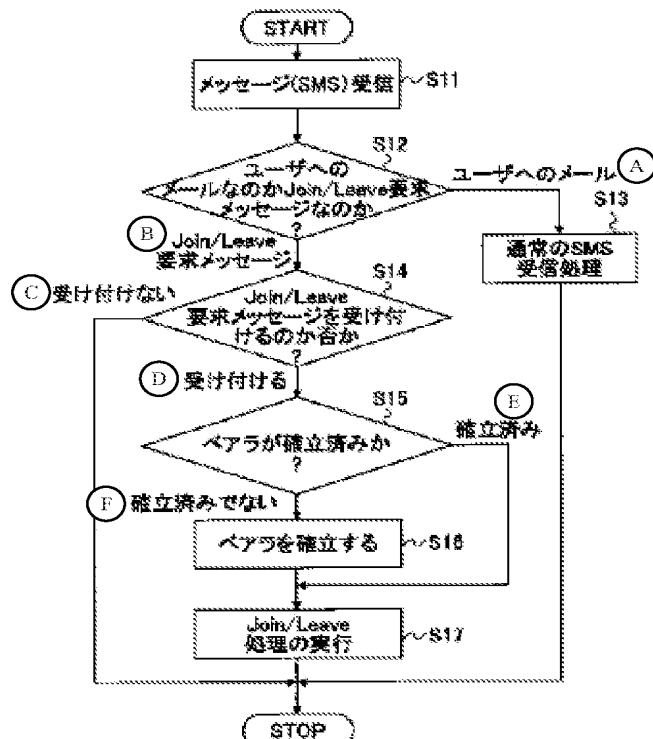


Figure 4. Flow chart illustrating an example of the processing carried out by the client after it has received a Join/Leave request message

Key:

- A Mail to the user
- B Join/Leave request message
- C Do not accept
- D Accept
- E Established
- F Not established

S11 Receive message (SMS)

S12 Is the message mail sent to the user or a Join/Leave request message?

S13 Normal SMS reception processing

S14 Accept the Join/Leave request message?

S15 Is the bearer established?

S16 Establish the bearer

S17 Carry out the Join/Leave processing

Continued from front page

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